

What is claimed is:

1           1. A computer-implemented method of debugging an object-oriented  
2 computer program, the method comprising:  
3           (a) in response to user input, setting an inheritance breakpoint that is  
4 associated with a first program entity in the object-oriented computer program  
5 in which is identified a method; and  
6           (b) halting execution of the object-oriented computer program during  
7 debugging in response to reaching an implementation of the method defined in  
8 a second program entity in the object-oriented computer program that is  
9 different from the first program entity.

1           2. The computer-implemented method of claim 1, wherein the first program  
2 entity is an interface that identifies the method, and wherein the second program entity  
3 is a class that implements the method.

1           3. The computer-implemented method of claim 1, wherein the first program  
2 entity is a first class that includes a second implementation of the method, wherein the  
3 second program entity is a second class that inherits from the first class, and wherein  
4 the first implementation of the method in the second class overrides the second  
5 implementation of the method in the first class.

1           4. The computer-implemented method of claim 3, wherein the second class is  
2 a subclass of the first class.

1           5. The computer-implemented method of claim 1, wherein the first program  
2 entity is an abstract class that identifies the method, and wherein the second program  
3 entity is a non-abstract class that implements the method.

1           6. The computer-implemented method of claim 1, wherein the inheritance  
2 breakpoint is additionally associated with the method.

1           7. The computer-implemented method of claim 6, wherein setting the  
2 inheritance breakpoint includes storing in a breakpoint data structure an entry that  
3 identifies the first program entity and the method.

1           8. The computer-implemented method of claim 1, further comprising, during  
2 loading of a class in the object-oriented computer program, identifying each  
3 implementation of the method in the class and setting a breakpoint on such  
4 implementation, wherein halting execution of the object-oriented computer program  
5 during debugging in response to reaching the implementation of the method includes  
6 reaching a breakpoint set on such implementation.

1           9. The computer-implemented method of claim 1, further comprising setting a  
2 breakpoint on each implementation of the method, wherein halting execution of the  
3 object-oriented computer program during debugging in response to reaching the  
4 implementation of the method includes reaching a breakpoint set on such  
5 implementation.

1           10. The computer-implemented method of claim 9, wherein setting a  
2 breakpoint on each implementation of the method includes setting a breakpoint on a  
3 first statement in an implementation of the method.

1           11. The computer-implemented method of claim 9, wherein setting a  
2 breakpoint on each implementation of the method includes setting a breakpoint on a  
3 method call to an implementation of the method.

1           12. The computer-implemented method of claim 1, wherein setting the  
2 inheritance breakpoint includes associating a user-specified condition with the  
3 inheritance breakpoint, and wherein halting execution of the object-oriented computer  
4 program during debugging in response to reaching the implementation of the method  
5 is performed only if the user-specified condition has been met.

- 1           13. A computer-implemented method of debugging an object-oriented
- 2 computer program, the method comprising:
- 3           (a) in response to user input, setting an inheritance breakpoint that is
- 4 associated with a first class in the object-oriented computer program in which
- 5 is identified a method; and
- 6           (b) halting execution of the object-oriented computer program during
- 7 debugging in response to reaching an implementation of the method defined in
- 8 a second class in the object-oriented computer program that inherits from the
- 9 first class.

- 1           14. A computer-implemented method of debugging an object-oriented
- 2 computer program, the method comprising:
- 3           (a) in response to user input, setting an inheritance breakpoint that is
- 4 associated with an interface in the object-oriented computer program in which
- 5 is identified a method; and
- 6           (b) halting execution of the object-oriented computer program during
- 7 debugging in response to reaching an implementation of the method defined in
- 8 a class in the object-oriented computer program that implements the interface.

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1           15. A computer-implemented method of debugging an object-oriented  
2 computer program, the method comprising:  
3           (a) receiving user input to halt program execution during debugging in  
4 response to reaching any of a plurality of implementations of a method in an  
5 object-oriented computer program; and  
6           (b) thereafter setting a breakpoint for at least a subset of the plurality  
7 of implementations such that execution of the object-oriented computer  
8 program will be halted in response to reaching any of the implementations on  
9 which a breakpoint has been set.

1           16. The computer-implemented method of claim 15, wherein the user input to  
2 halt program execution includes user input to set an inheritance breakpoint on the  
3 method.

1           17. The computer-implemented method of claim 15, wherein setting the  
2 breakpoint includes, during loading of a class in the object-oriented computer  
3 program, identifying each implementation of the method in the class and setting a  
4 breakpoint on such implementation.

1 18. An apparatus, comprising:

2 (a) a memory within which is resident at least a portion of an object-  
3 oriented computer program under debug, the object-oriented computer  
4 program including a first program entity in which is identified a method, and a  
5 second program entity that is different from the first program entity, and that  
6 includes an implementation of the method; and

7 (b) program code configured to set an inheritance breakpoint that is  
8 associated with the first program entity in response to user input, and to halt  
9 execution of the object-oriented computer program during debugging in  
10 response to reaching the implementation of the method defined in the second  
11 program entity.

1 19. The apparatus of claim 18, wherein the first program entity is an interface  
2 that identifies the method, and wherein the second program entity is a class that  
3 implements the method.

1 20. The apparatus of claim 18, wherein the first program entity is a first class  
2 that includes a second implementation of the method, wherein the second program  
3 entity is a second class that inherits from the first class, and wherein the first  
4 implementation of the method in the second class overrides the second  
5 implementation of the method in the first class.

1 21. The apparatus of claim 18, wherein the first program entity is an abstract  
2 class that identifies the method, and wherein the second program entity is a non-  
3 abstract class that implements the method.

1 22. The apparatus of claim 18, wherein the inheritance breakpoint is  
2 additionally associated with the method, and wherein the program code is configured  
3 to store in a breakpoint data structure an entry that identifies the first program entity  
4 and the method.

1           23. The apparatus of claim 18, wherein the program code is further configured  
2 to set a breakpoint on each implementation of the method, and wherein the program  
3 code is configured to halt execution of the object-oriented computer program during  
4 debugging in response to reaching a breakpoint set on such implementation.

1           24. The apparatus of claim 23, wherein the program code is configured to set  
2 the breakpoint on each implementation of the method by dynamically setting a  
3 breakpoint on each implementation of the method in a class in the object-oriented  
4 computer program during loading of the class.

1           25. The apparatus of claim 18, wherein the program code is configured to  
2 associate a user-specified condition with the inheritance breakpoint, and wherein the  
3 program code is configured to halt execution of the object-oriented computer program  
4 during debugging in response to reaching the implementation of the method only if  
5 the user-specified condition has been met.

1       26. An apparatus, comprising:

2               (a) a memory within which is resident at least a portion of an object-  
3       oriented computer program under debug, the object-oriented computer  
4       program including a method and a plurality of implementations of the method;  
5       and

6               (b) program code configured to receive user input to halt program  
7       execution during debugging in response to reaching any of the plurality of  
8       implementations of the method, and to thereafter set a breakpoint for at least a  
9       subset of the plurality of implementations such that execution of the object-  
10      oriented computer program will be halted in response to reaching any of the  
11      implementations on which a breakpoint has been set.

1       27. The apparatus of claim 26, wherein the user input to halt program  
2       execution includes user input to set an inheritance breakpoint on the method, and  
3       wherein the program code is configured to set a breakpoint by, during loading of a  
4       class in the object-oriented computer program, identifying each implementation of the  
5       method in the class and setting a breakpoint on such implementation.



- 1        28. A program product, comprising:
- 2                (a) program code configured to set an inheritance breakpoint in
- 3        response to user input, wherein the inheritance breakpoint is associated with a
- 4        first program entity in an object-oriented computer program in which is
- 5        identified a method, and to halt execution of the object-oriented computer
- 6        program during debugging in response to reaching an implementation of the
- 7        method defined in a second program entity in the object-oriented computer
- 8        program that is different from the first program entity; and
- 9                (b) a signal bearing medium bearing the program code.

- 1        29. The program product of claim 28, wherein the signal bearing medium
- 2        includes at least one of a transmission medium and a recordable medium.

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